Issue Paper #2: Determining the Corps Jurisdictional Boundary in Puget Sound

Issue: Exh. 5 - Deliberative Process

Background

- Currently, the Corps Seattle District uses the mean MHHW mark to define the *high tide line*. The HAT is the highest tide that occurs every 19 years and is landward of the MHHW.
- According to federal law, "*high tide line*" means the line of intersection between the land and the water's surface at the maximum height reached by a rising tide. It encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges (Clean Water Act (33 CFR § 3.28(d)).
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- NMFS uses the extreme high tide line as the landward boundary when designating critical habitat for ESA-listed salmon. The HAT boundary is same as the extreme tide line.
- The HAT elevation ranges from 1.3-2.7 feet higher than MHHW across Puget Sound, depending on distance from the ocean. Depending on the gradient and geographic location, this variance can result in a substantial amount of shoreline falling outside the Seattle District Corps regulatory review. For example, assuming a height differential between the MHHW and HAT of 2.0 ft. and a beach gradient of 1%, approximately 200 ft. of shoreline with functional aquatic habitat is outside current federal regulatory review in Puget Sound.
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Recommendation and Next Steps:

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Additional Background:

Tidal Height Information available for all of Puget Sound

There are complete tidal datums for 14 tidal stations currently operated within Puget Sound. Less complete data are available for many other stations. Table 1 gives HAT and MHHW datums for 7 currently operated stations and 28 other sites (*). Online tidal predictions are available for many sites around Puget Sound and the HAT can be determined for any of those sites (e.g., http://tidesandcurrents.noaa.gov/tide_predictions.shtml?gid=259).

Table 1. Differences between highest predicted high-tide-line (HAT) & MHHW for Puget Sound tidal stations.

Station Location	**HAT (feet)**	**MHHW (ft)**	**Difference between HAT and MHHW (ft)**
Seattle	**13.3**	11.4	1.9
Tacoma	**13.8**	11.8	2.0
Port Angeles	**9.1**	7.1	2.0
Friday Harbor	**9.7**	7.8	1.9
Cherry Point	**11.0**	9.2	1.8
Port Townsend	**10.0**	8.5	1.5
Bellingham*	**9.8**	8.5	1.3
Everett*	**12.9**	11.1	1.8
Olympia*	**17.1**	14.6	2.5
Allyn*	**16.7**	14.2	2.5
Shelton*	**16.7**	14.2	2.5
Bangor	**12.9**	11.1	1.8
Union*	**13.8**	11.8	2.0
Lynch Cove*	**14.2**	12.1	2.1
Dyes Inlet*	**14.1**	11.6	2.5
Quilcene*	**13.3**	11.4	1.9
La Connor*	**12.0**	10.4	1.6
Des Moines*	**13.7**	12.0	1.7
Port Gamble*	**12.0**	10.3	1.7
Gig Harbor*	**14.0**	11.8	2.2
Totten Inlet head*	**17.7**	15.0	2.7
Steilacoom*	**16.0**	13.5	2.5
Kayak Pt*	**13.2**	11.2	2.0
Quartermaster Harbor*	**14.1**	12.5	1.5
Dungeness*	**8.9**	7.6	1.3
Coupeville*	**13.4**	11.7	1.7
Discovery Bay*	**9.3**	7.9	1.4
Pouslbo*	**13.7**	11.7	2.0
Bremerton*	**13.8**	11.7	2.1
Carr Inlet – Arletta*	**15.7**	13.3	2.4
Eagle Hbr-Bainbridge Is*	**13.3**	11.6	1.7
Kingston*	**12.9**	11.0	1.9
McMicken Is*	**16.5**	14.0	2.5
Anacortes*	**9.4**	7.3	2.1
Shaw Island*	**8.9**	7.2	1.7

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1. The regulations for the jurisdictional limits of the authority of the Corps of Engineers under the Clean Water Act state the "*high tide line"* means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide.… encompasses spring high tides andother high tides that occur with periodic frequency but does not include storm surges… (33 CFR § 328.3(d)). The term *tidal waters* means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun (33 CFR § 328.3(f))." But the Corps's current jurisdiction for permitting, i.e., mean higher high water (MHHW), is not an upper limit of tidal waters; rather, it is a calculated average of all the higher of the two daily high tides over the 18.6 year tidal cycle.

2. In Puget Sound, the MHHW is 1.5 to 2.5 feet below the *high tide line*. Each section of the US coast has a unique pattern of tides, with the tides found in Puget Sound revealed in more than a century of detailed observations at Seattle (NOAA Tidal Station 9447130). Because tides are caused by periodic influences of the moon and sun, the highest predicted tide is known as the highest astronomical tide (HAT) and recurs on an 18.6 year cycle. At Seattle, the HAT is 1.9 feet higher than MHHW, with about 14% of the total predicted tidal range between the MHHW and the HAT. At Seattle, tides below the HAT and above MHHW occur about 4% of the time over the 18.6 year cycle. As the ocean's tidal oscillations move into and out of Puget Sound, the greater distance from the ocean to the longest thread of the Sound means the tide range is greater there compared to near the ocean. So the difference between HAT and MHHW at Olympia and Shelton (2.5 feet) is greater than at Seattle, and the difference at Port Townsend is less (1.5 feet). Much of the upper foreshore and perhaps all the backshore of Puget Sound beaches are above MHHW.

3. The upper limit of nearshore critical habitat for salmon in Puget Sound is the same as HAT, i.e., the "area inundated by extreme high tide" (70 FR 52637, Sept 2, 2005). Recovery of nearshore salmon critical habitats will be impaired by not extending Corps jurisdiction above MHHW.

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5. More than 1 mile of Puget Sound is newly armored each year, presumably in tidal waters, mostly without Corps permitting and therefore without ESA §7a2 consultation with NMFS. The recent extent of new, replaced, and removed armored shoreline in Puget Sound was

studied by WDFW. HPAs were issued for 980 shoreline armoring projects over 6 recent years in Puget Sound (with the number each year ranging from about 110 to 250). The number of related Corps permits is unknown but likely small. Overall, these 980 projects resulted in 6.5 mi of new shoreline armor, 14.5 mi of replacement armor, and 0.6 mi of armor removal. Over the 6 year period new armoring averaged 1.1 mi per year. Single-family residential projects accounted for most (76%) of the new armoring, followed by government installations (14%), with commercial at 3%. Many of these new and rebuilt bulkheads likely have adverse effects on designated salmon critical habitat.